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GETTING THE WORK OUT

THE TWENTIETH WORK MANUAL

OF THE

MODERN FOREMANSHIP AND
PRODUCTION METHODS COURSE

KANSAS EXTENSION UNIVERSITY

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*The greatest thrill that can come
to any man is the thrill of suc-
cessful accomplishment.*

CHARLES M. SCHWAB

LASALLE EXTENSION UNIVERSITY

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DEPARTMENT OF
MODERN FOREMANSHIP

To the Students of
Modern Foremanship:

Do you remember the day the big "boss" called you in and told you that one of the departments had been falling down in production and that he had decided to give you a chance? Do you remember his last words? No doubt they were something like this: "Here is your opportunity, but I expect you to GET THE WORK OUT."

In the course of your talk, he brought out some of the personal qualities which you charted in the first manual. He had noticed these in you when looking for a foreman, but whether you possess one quality—the ability to get the work out—can be determined only by trying you on the job.

But this ability may be acquired or increased by training, in just the same way that your knowledge of leadership, job analysis, and the study of your own job, has grown thru your work with previous manuals. To enable you to increase your ability to get the workout, and to prepare you so that you will not fail when the test comes, is the purpose of this manual.

This eighth work manual on "Getting the Work Out" not only forewarns you of the troubles and obstacles which might interfere with production, but it also shows the four big steps which each job must follow if it is to get thru the shop when wanted. Getting the work out is an important basis upon which the foreman is advanced in position and responsibility.

Probably no factory is satisfied with its present production. That you are taking this course indicates that you are anxious to improve your ability to accomplish things. Solving the problem in this manual will suggest a method of analyzing the problems you meet so that you can better handle those which come up in connection with your job.

If at any time you meet with any difficulties either in connection with the manual, the problem, or your job, be sure to drop me a line and tell me. I shall be glad to help you at any time.

The rewards come to those who get the work out—there is a reward also for the completion of this course, to be paid to you in returns from increased ability.

Sincerely,



Hugo Diemer, Director

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DEPARTMENT OF MODERN FOREMANSHIP

HUGO DIEMER, *Director*

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MODERN FOREMANSHIP PROBLEM NO. 8

If everything ran smoothly in the shop, all that you would have to do after you got it going well would be to sit back and watch it go. But you know that shops do not run that way. Troubles are constantly coming up; difficulties are continually interfering with the schedules. Your success is largely dependent upon your ability to overcome these difficulties.

Some foremen are more successful than others in overcoming these difficulties. This fact is generally due to their having a better grasp of the problems they meet and a knowledge of how to solve them. To assist you in analyzing the problems you meet, try solving the following typical examples of difficulties, which you might face at any time in any shop.

Johnson took over the foremanship in a shop where conditions were described to him as being "in an awful mess." For months nothing had been shipped when promised. Delivery dates were, on some orders, over a month behind. On others, parts did not fit when finished and so had to be scrapped and new ones manufactured. There seemed to be troubles ahead of him everywhere..

Johnson was to begin work Monday morning. Saturday afternoon, after the shop had closed, he went thru the department with the sub-foreman, who was familiar with what was going on in the shop and who was going to remain as his assistant. Johnson took a pencil and paper and jotted down the troubles as he came to them. Here are some of those he found.

The sub-foreman could tell him about the "mess" they were in, but was not able to analyze the troubles, or to find the cause and suggest a remedy. From the notes taken from what Johnson saw, and details brought out by skillful questioning of his assistant, he found the difficulties which affected the getting out of the work. These are described on the following pages.

Tell what caused the tie-up in production in each case and then what you would do if you were in Johnson's place. Read the whole problem over before beginning to put down your suggestions.

First, Johnson found one machine with a big pile of unfinished work. Questioning brought out the fact that practically all parts manufactured required at least one operation on one or the other of the two machines of this kind in the shop. The other machine was partially dismantled. The regular operator of the idle machine was sick, the assistant said, and a green man, who had been placed in charge without any instructions from the foreman, had stripped some teeth out of a gear. As there was nobody to run the machine, they "had not taken the trouble to fix it up." They had preferred to work the one man overtime, but he could not keep up. Johnson also found that several of the men and machines working on the parts were idle part of the time later. The plan of giving the one operator a helper in the emergency had not been tried out.

What would you do

—with the extra machine?

—about getting an operator for it?

What would help you in deciding whether it would increase the output to give the man a helper, and

What provisions would you take to prevent this kind of tie-up in the future?

Second, A large load of machine parts in a truck marked "scrap" next drew Johnson's attention. The sub-foreman said that these had been machined to a wrong dimension in the second of five operations and had to be scrapped. The assembly department was "hollering" for some more of these parts, but he didn't "see how they could get them out with all the other work behind as it was." A few questions brought out the fact that the operator who spoiled the parts had checked his own set-up. "We didn't lose anything," said the sub-foreman, "because the operator was on piece work and did not receive his piece rates on the rejected pieces."

. What would you do?

Why is it necessary to get new parts out as quickly as possible for the assembly department?

What would you do to prevent similar errors' occurring in the future?

What did the company lose even tho it saved the piece-work cost on one operation?

Third, Johnson worked out a chart to check up the results and causes of his shop troubles. For your convenience, this chart is reproduced here. Check on this the results which might come from any of the causes shown. For example, "No power" would result in stoppage of work. Some of the causes obviously might have more than one result. In such a case, check all the results which might happen.

CAUSES		RESULTS				
		COMPLETE HOLD-UP	SLOW WORK	REWORKING NECESSARY	SCRAP	OTHER
PLANS	INCORRECT					
	NOT FOLLOWED					
	INADEQUATE					
PREPARATION	MEN					
	MACHINES					
	EQUIPMENT-TOOLS					
	" SUPPLIES					
	WORK ITSELF					
SCHEDULING DISPATCHING	POOR JUDGMENT					
	RECORDS - SLOW					
	" INCOMPLETE					
	" INCORRECT					
	RUSH WORK					
	NOT FOLLOWED					
TRUE INTERFERENCE	POOR STOCK					
	OTHER SHOPS FAULT					
	NO WORK					
	MACHINE TROUBLE					
	TOOL TROUBLE					
	POWER TRANS TROUBLE					
	NO POWER					
	MEN ABSENT					
	" UNDER STRAIN					
	" OTHER MOTIVES					
	FOREMAN'S ERROR					
INSPECTION	STANDARDS TOO LOW					
	" TOO RIGID					
	METHODS-DELAY WORK					
	" - DON'T AID SHOP					
	MADE TOO FREQUENTLY					
	MADE TOO SELDOM					

GETTING THE WORK OUT

THE EIGHTH WORK MANUAL

MODERN FOREMANSHIP AND PRODUCTION METHODS

Being the Expression of Practical Foremen

Assembled, Organized, and Edited by

HUGO DIEMER, MEYER BLOOMFIELD, DANIEL BLOOMFIELD
AND E. F. DAHM

In Coöperation with Others



LA SALLE EXTENSION UNIVERSITY
CHICAGO

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No. 1.

Perhaps you have admired some other foreman because of the way he has been able to forge ahead in the shop. His department is always running smoothly; nothing seems to interrupt production; his promise to have a job finished at a certain time can be relied on; the management and the workers have confidence in him because he gets the work out; and he is reported to be the best-paid foreman in the shop.

No doubt you too have wished for a greater measure of the self-confidence and the other factors which go with the ability to get the work out.

In this manual, over 5,000 foremen have "let you in" on their "secrets" for getting the work out. And like many other confidences, they are not real secrets, but are principles which can be learned and which when put into practice, simplify the production problems you are called upon to face.

The experiences of these 5,000 foremen show that there are only four steps to any job. If these are performed properly and in the proper order, and if the personal production qualities described in previous manuals are developed, you, too, will be able to get the work out as promised and win the confidence of those with whom you work.

THE MODERN FOREMANSHIP COUNCIL

There are production managers, practicing foremen, executive officers, labor managers, and educators on this Foremanship Council.

Tho from different walks of life, they have one strong tie binding them together—that is, their experience with and interest in the work of Modern Foremen.

The Council reviews the course and lessons and serves in an advisory capacity. It brings to bear on the planning, organization, presentation, and service of the Modern Foremanship and Production Methods Course the judgment of experts from all important points of view. In many minds there is increased wisdom and safety of judgment.

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- Hugo Diemer, Director, Modern Foremanship and Production Methods Course

THE FIFTEEN WORK MANUALS

of the Course in

MODERN FOREMANSHIP

and

PRODUCTION METHODS

- I. The Foreman and His Job
- II. The Working Force
- III. Leadership
- IV. The Foreman and Training
- V. The Foreman and Job Analysis
- VI. The Flow of Work
- VII. A Good Place to Work
- VIII. Getting the Work Out
- IX. The Foreman as Stockkeeper
- X. Cost Control in the Shop
- XI. Industrial Organization
- XII. What Is Production and Why?
- XIII. Wages and Incentives
- XIV. The Foreman and the Law
- XV. The Foreman and Industrial Service

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Who makes the shop “go”?

GETTING THE WORK OUT

"I'm sorry for Brockway," mused the superintendent. "He surely wants to make good in the foremanship of that job. He's a fine boy, Brockway is, quite a reader and a student. But when it comes to getting the work out, he's fallen down. Well, I'll just have to take him off and find a man for the press shop who can deliver the goods."

Therefore, a few days later Brockway was removed from the foremanship of the shop, and Sorensen, a quiet, alert man of about forty, was put in his place.

Brockway felt deeply the reproach of his removal, and in the comparative quiet of the tool-making department, to which he had been transferred, he wondered just how he had failed, and he half expected to hear any day that Sorensen also was finding it impossible to manage the unruly department.

But weeks went by, and Sorensen had evidently succeeded. Then one day the superintendent summoned Brockway into his office.

"Will," said the old superintendent kindly, "you probably haven't forgotten the trouble you had in the press shop. Sorensen was put in your place and he has made good. Now we are still hard up for good foremen; and while you failed in this case, yet I believe that you have the makings of a good foreman in you. What I want you to do is to go to school to Sorensen. He is a good scout and will show you how he does it. And when you've learned your lesson, we've got a department here in the plant that I'll give you charge of. I am banking on you to make good, and I am certain that I shall not be disappointed."

"I'm only too glad to jump at the chance, Mr. Hathaway," Brockway replied. "I'm young yet, and I've got considerable to learn. Mr. Sorensen's success with his shop after I fell down trying to run it, shows that he can teach me something. I don't care how I learn it. The one thing that counts with me is my ability to make good."

So Brockway went back into his old department, but this time under Sorensen. In a few weeks Sorensen had taught him his secret, and Brockway stepped out to take charge of another department, which he managed successfully from the first day he was in charge.

The Secret of Getting the Work Out

Veteran foremen who read these pages do not need to be told the secret that Brockway learned from Sorensen. But men new at foremanship and those who are aspiring to become foremen, will do well to study this secret over and over again, for on it hinges the success of every foreman who makes good.

Briefly the secret is this: In order to get the work thru your department, it is not enough that you **KNOW** about shop practice and foremanship; you must **USE** what you know **AT THE TIME** when the job demands it.

The Character of the Successful Foreman

The successful foreman has a whole lot of "drive" in his make-up. This does not mean that he has to bully his men, but it means that he won't let the work stand still. It must go thru, and he sees to it that it does go thru.

Every job "wants what it wants when it wants it." It is this "on time" element that counts big in industry, and the foreman who can bring the job thru on scheduled time is the man who gets and holds the successful foremanship positions in the present-day industrial world.

The "Use" Character of This Manual

This manual proposes to go into detail in explaining the secret that caused Sorensen's success and enabled Brockway later to handle a foreman's job well—the secret of how to get the work out.

Proficient foremen will find in this book many things that they know already; therefore for them the manual will be largely an aid in brushing up their memories and in placing their experience in handy, usable form.

Others will find that this is the "do it" manual of the series. It is not so much a book to be read and reflected on as it is a tool to be taken on the job with you, and definitely employed in putting the job thru.

Why the Foreman Is Needed on the Job

When Sorensen took charge of that shop, he found a going concern. Somebody had already planned it, and previous foremen had been putting work thru. It was Sorensen's business to see to it that the work went thru as planned.

Now if that department had been like some wonderful clock, which could be wound up once a year and made to run smoothly till the

next year's winding, then Sorensen, as foreman, would not have been needed. But a department in an industry is not at all like a good clock. If it is not constantly watched and trouble prepared against, it may get out of order every hour or so.

The Foreman Must Prevent and Overcome Trouble

Four kinds of trouble as shown below may happen to work as it goes thru a foreman's department:

1. Slow production
2. Work completely held up
3. Need of reworking operations to rectify mistakes
4. Necessity of scrapping the work

If the foreman can prevent any of these troubles from occurring, or if, when one of these troubles does occur, he can straighten matters out quickly, he is a success as a foreman. If he cannot prevent these troubles, or cannot remedy them quickly when they do occur, to that extent he is unsuccessful.

What the Foreman Should Do to Overcome Trouble

The following steps illustrate the kinds of work that go into every job. The foreman

who keeps in his mind a picture of what makes up every job, and who realizes that trouble may happen at any step, will be all the more likely to forestall it. Nothing prevents trouble more than systematic preparation.

The Four Steps of Every Job

- Step 1. The job must be planned.
- Step 2. The job must be prepared for.
- Step 3. The job must be scheduled and dispatched.
- Step 4. The job must be done and inspected.

Here, then, we are "getting down to cases." Successfully getting the work out means that the foreman must anticipate and prevent trouble in planning the job, in preparing for it, in scheduling and dispatching it, and in actually doing and inspecting it. And if, in spite of his watchfulness, trouble does develop in connection with any of these steps, then good foremanship demands that the foreman find the trouble at once, rectify it so that the work can go on according to schedule, and take the necessary steps to prevent that trouble from occurring again.

Preventing Trouble in Connection with Planning the Job

Even in organizations where the works manager, the superintendent, or a planning department plans the work which goes thru a foreman's shop, the foreman is not relieved from the need of giving thought to planning. On the contrary, every foreman has two very definite planning duties to perform.

In the first place, he must clearly understand the plans that have been sent him. He must have a clear picture of the results that the superintendent or the planning department has in mind for that job.

In the second place, he must have a definite plan or scheme as to just how he will get the results desired.

The foreman who lives up to these two planning duties has taken the first step, in preventing trouble from arising in connection with the work going thru his department. Therefore it will pay us to consider each of these duties a little more in detail.

How the Foreman Comes to Understand the Plans

As a rule, the foreman receives a very clear and definite description as to what work his

department is to perform on a job. This description may be in the form of blue prints, specifications, etc., or it may be less detailed. It may be that you are expected to supply some of the missing details.

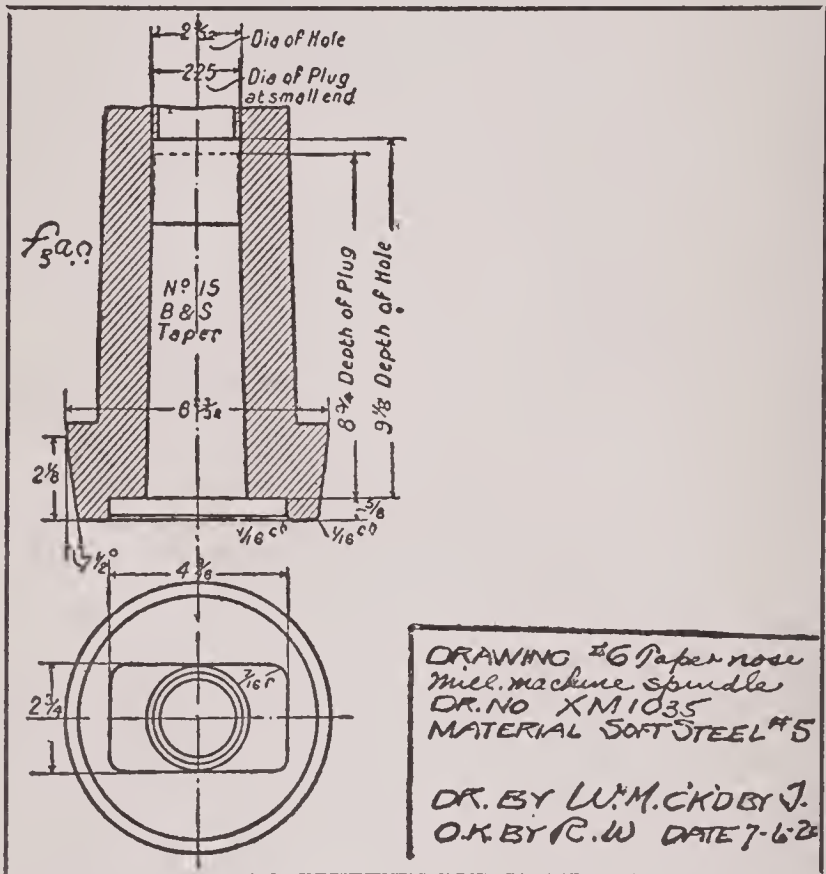


Fig. 1.—“Don’t say it, put it in writing,” is a good slogan in factory management. When the description of what is to be done on every job is reduced to “black and white” as in the above, there is little or no chance of working in the dark.

Now, whether the plans are given you largely in detail, or whether you furnish much of the detail yourself, there are three chances for

trouble to arise in connection with your getting your plans for the work.

In the first place, the plans may be incorrect, and if you attempt to follow them out, either you may find the work impossible to do or you may put thru work that cannot be used, in which case your company suffers a loss. There may be several reasons for errors in blue prints and specifications—errors of drawing, as where a draftsman makes an incorrect drawing based on a correct drawing of a part somewhat similar; errors of typing, as where the copy is blurred and hard to read; errors of writing, as where an order for 10,000 is copied as for 100,000, or where a tolerance of .005 is given as of .0005; errors of judgment, as where, for instance, in work in a buffing shop, a high finish is called for on a product which cannot take it, owing to the quality of the material of which it is made.

The second cause of trouble in connection with your getting your plans for your work may be the fact that the plans or directions are inadequate. Some important dimension may be omitted from the blue print, or some necessary operation may be left entirely out of the specification.

In one case the specifications that came into a forge shop failed to specify the dies, and the foreman chose dies having too deep an impression. The result was that the forgings were oversize, and made extra work necessary for the machining shops to machine them to size.

In many cases the foreman would not be justified in attempting to supply the missing information himself. Go to the planning department for further necessary details.

The third chance for trouble in connection with the plans you receive may lie in the fact that you do not follow these plans. While it is true that errors may occur in the planning department's specifications, it is equally true that the foreman's department may make errors in failing to follow the specifications. It may be possible to misunderstand or to overlook perfectly clear directions; for instance, a worker may have difficulty in reading blue prints.

Laying Out a Plan for Doing the Work

You will recall that on page 13 it was stated that the foreman has two duties in connection with the plans for his work; he must know what to make and how to make it. The

“what” information usually comes to him in the form of a blue print or other specification. But how does he get the “how” information?

In plants where planning departments have been organized to take over much of the plan-

PREMIUM INSTRUCTION CARD					
DETAILED INSTRUCTIONS				PREPARATION TIME	THIS WORK SHOULD TAKE (MINUTES).
1	CLEAN VIG				.080
2	PLACE TO JIG AND SECURE				.120
3	JIG TO PLACE AND SECURE				.065
TIME FOR ONE PIECE					4.662
WHEN WORK CANNOT BE DONE AS SHOWN, CARD SIGNED BY REPORT MUST BE MADE AT ONCE TO THE MAN WHO SIGNED THIS CARD DATE 7-6-29 M. X.				NAME OF PART CUPPING DIE	ORDER NO OCCNO
SKETCH (SKETCH OF PART SHOWN HERE)				ROAD OF MATERIAL CLASS 4 STEEL	MACHINE WIDENING PRESS
				UNIT - Piece	REWORK TIME REWORK UNIT REWORK TIME
TIME WORK SHOULD TAKE				TIME PARTS 7.75	4.662
PRODUCTION PER HOUR					12.0

Fig. 2.—Very often it is necessary to give more detailed instructions than can be supplied by Fig. 1. In that case, an instruction card such as the one shown above answers the purposes quite satisfactorily. Such instructions leave nothing to the worker's imagination.

ning function, the foreman, at the time he receives his blue prints or specifications of the work to be done, also receives a plan of work, which probably consists of the following:

1. A list of the operations to be performed on the job. This may be called the general plan, or the route sheet, or the operation list. It describes primarily what operations, on what

machines, are necessary to do the job. With it may also go detailed instruction that tells the operators just how to do each operation most effectively, with standard time allowances. These detailed instructions are generally called instruction cards.

2. A list of the materials needed on the job. This is called the bill of material.
3. A list of the tools needed on the job.

OPERATION LIST							
Description of Part.....				Order No.....			
.....Sym. of Part				Date.....			
Op. No.	Operation	Shop	Mach.	Equipment	Treatment	Finish	Remarks

Fig. 3.—An operation list such as this one, is part of the instructions turned over to the foreman by the planning department. Where there is no planning department, the making out of the list rests largely with the superintendent or the foremen.

We have already noticed that in a plan of what the job is, trouble may arise in three ways—incorrect plans, incomplete plans, and plans not followed. In like manner, in the matter of how the job is to be performed, the same three troubles may arise—incorrect

scheme, incomplete scheme, and scheme not followed. To prevent such trouble from arising, the foreman has to go over his plan of work (route sheet, operation list, instruction

BILL OF MATERIAL								
For.....Shop								
Description of Article.....					Order No.....			
.....Symbol					Date.....			
Name of Part	Part Sym.	Material	Mat'l Sym.	Quantity	Purchase or Stores	Purchase Order Issued	Date Rec'd	Date Issued

Fig. 4.—A material list enumerates all the material necessary on every job and is issued to the foreman before the job goes into work. Job analysis is the big management help which makes it possible to provide this advance information.

card, bill of material, and tool list) to be sure that it is correct and complete, and then has to see to it that the workers follow out the instructions there given.

Where planning departments are not developed to furnish this information, the foreman must rely upon himself and the men under him. Modern tendencies are strongly toward the specialized planning, but the older system is still widely used.

So the first step in getting out the work is to know what the job is and exactly how it is to be done. The foreman's job here largely is to see that these two steps are clearly outlined. Then comes the first active work of the shop, in getting ready everything necessary with which to do the work.

LIST OF SPECIAL TOOLS							
For.....Shop							
Description of Article.....				Order No.....			
.....Sym. of Art.				Date.....			
Description of Tool	Tool Sym.	Order From	Number Needed	Part Sym.	Part	Operation	Op. No.

Fig. 5.—Without a tool list, the advance information about a job would be incomplete. Such a list is usually made out on a form like this one and goes a long ways toward giving the worker as well as the foreman the right slant on the job.

Make Sure the Shop Is Ready to Do the Work

The next thing to do after finding out what the job is and how it is to be done, is to get everything in readiness to do the work. The forge shop with detailed plans and instructions can do no work until the dies are available. The power loom of the weaver "down for repairs" often holds up work. Poor equipment means

poor work. Untrained men mean waste time and spoiled work. Little dribblets of work, broken lots, etc., cause easily avoidable delays. Each foreman has his own individual problems of preparation, but in any line of industry the matter of preparation may be considered under these four headings:

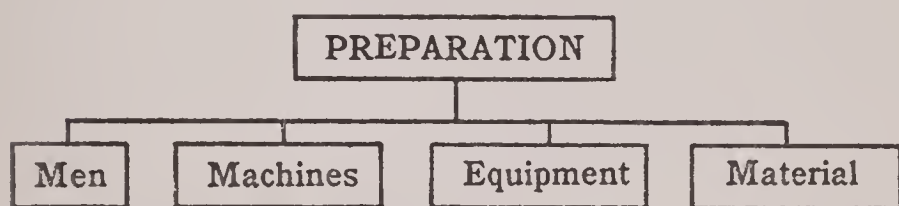


Fig. 6.—No matter whether a foreman works in a large plant or in a small shop or factory, and irrespective of the product he is working on, he must meet his advance preparation problems by systematically organizing these four factors.

When it is practicable, it is the best plan before any work is done to get together in the shop all the equipment and all the material that go to make up the finished job. Then the chance of anything's going wrong is at a minimum. But often this cannot be done. In that case the foreman must do his best to see that everything will be at hand when it is needed. Since this means dependence on someone else, who may make a slip, and since you do not know far in advance exactly when you are going to do any job, the only safe scheme obviously is, before starting, to get hold of everything in reason that you will require.

Prepare Your Men

Any job needs men to do it.

So good foremanship demands that a foreman have a working force that is sufficient in numbers, capable, willing to work, and able to work.

When a big job comes along, more help may be required. Sometimes this help can be obtained from other shops where work is slack. Sometimes new men must be hired. In either case, the good foreman makes sure that men are obtained in time and are fitted to the work.

But the preparation of men is a bigger proposition than just this one job. It goes away back thru the history of the shop. The foreman himself, as well as his men, must be capable, trained, and loyal.

The third manual, "Leadership," and the fourth manual, "The Foreman and Training," contain many valuable suggestions for preparing men for jobs, and we suggest that you glance thru them again at this time.

How to Prepare Machines

Just as getting men ready is bigger than any one job, so also is the preparation of the ma-

chines, which is primarily a question of maintenance and repairs. The location of machines is important but is ordinarily a factor not easily changed, and often not under the control of the shop.

The foreman who has his machines repaired as soon as possible after breakdowns, avoids the delays that always come up if machines are repaired only when there is work for them. It pays to keep the engines, motors, shafting, and belting in equally good shape.

A glass factory found this to be true. The management refused to make some slight necessary repairs to the furnaces. The lining burned out. Results — furnaces were down when needed, and high expense was incurred for the repairs when finally made.

A certain railroad allowed its rolling stock to get into bad shape. When a boom started, it fell down badly, due solely to this cause.

Another case occurred in a machine shop. The gear cutter was allowed to wait for several months for some minor repairs. A rush job came thru. It was held up several days while the repairs were being made.

Periodic Inspection of Equipment

Many old foremen strongly advocate weekly inspections of all machinery. By this inspec-

tion they make sure not only that all machines are in good repair (or are being put in shape), but also that all are well cleaned and

MAKE PERIODIC INSPECTION OF EQUIPMENT

To Discover the Following Conditions:

Machines needing	{ repair cleaning oiling painting
------------------	--

Check up:

Installation of safety devices needed

Building repairs needed

Condition of floor (whether cluttered up with work or tools)

Fig. 7.—Haphazard or occasional inspections mean that every now and then work gets into "an awful mess" and half the force must mark time while the other half retraces its steps. Definite and periodic inspections are the only kind that are really worth while.

oiled. The painting of machines is noted at the same time.

In this connection it is well to see to the installation and maintenance of safety devices. Like the machine itself the safety devices may thru accident or design fail to work. Sooner or later someone suffers, as happens so frequently to metal press operators who remove the guards to speed up the work.

Successful foremen do not stop with seeing that the machines and power equipment are in good order, but see to it that the rest of the

TOOL TICKET			
Symbol of tool wanted.....			
Description of tool wanted.....			
Quantity wanted.....			
.....			
.....			
Worker's Numbers			
Month	Day	Year	Signed by Man Securing Tool
<p>NOTE—Only one kind of tool can be issued on this card.</p>			

Fig. 8.—It never pays to wait until the last minute before getting all the tools on hand for every job. It is equally bad practice to have the worker select his own tools. A tool ticket of which the one above is typical should always be issued.

shop is up to the same standard. This applies not only to building repairs but to the work floor. One old foreman has said:

“I never allow my floor to get cluttered up with work or tools. It hampers the flow of work and the operation of the machines as well as endangering the safety of my men. A clear floor is a good sign of efficiency.”

The Preparation of Tools and Equipment

In many shops, the foreman is given a tool list showing the special tools for his job. These he gets into his shop at once. It does not pay to wait until the last minute and have work held up because some special tool or fixture or supplies are being used on some other job or happen to be defective.

But equipment means a lot more than getting in special tools or supplies. How about the usual shop equipment? Perhaps the quantity on hand is too small. Some tools may need resharpening. Jigs and fixtures may need a thoro overhauling. Tool-room usage will be discussed further in the ninth manual, "The Foreman as Stockkeeper."

How to Get the Work Itself Ready

Preparation of the materials consists in getting into the shop the necessary raw materials and partly finished product in such quantity and condition that it can be processed in full accordance with the plans as laid out. The quicker the work is gotten into the shop, the better. All work should be carefully looked over and counted (if possible) as soon as it arrives. Old shop men seldom take the word of another shop or of the storekeeper that the

work sent in is in proper condition. It's a risky policy. There is no need here of instances to illustrate this.

You need not get all the material into the shop to start work. Very often it is neither possible nor advisable. But you should not start to work without sufficient work to make it worth while, and you must do your best to see that more work is ready when needed. Otherwise, in the long run, you will waste both time and money.

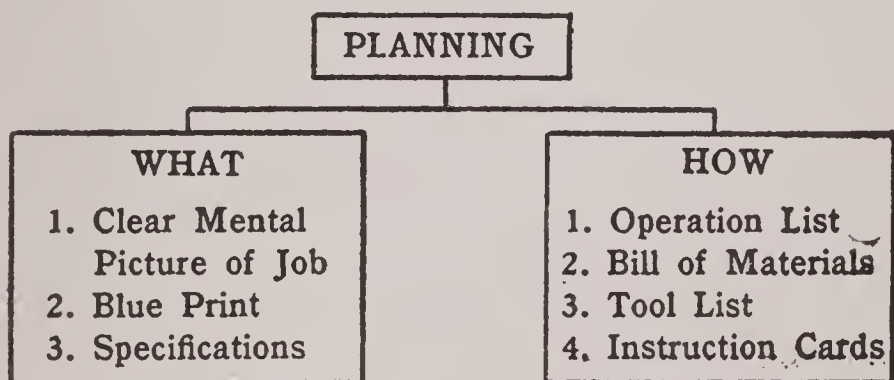


Fig. 9.—Two of the four steps necessary in getting the work out are graphically presented in the above chart. Fix them firmly in your mind before taking up the remaining steps. They are part of every job you undertake.

Let Us Stop and Summarize

On page 12 we mention the four main steps in performing a job—planning, preparing, starting (scheduling and dispatching), and doing (including inspecting). Two of these four steps we have now discussed.

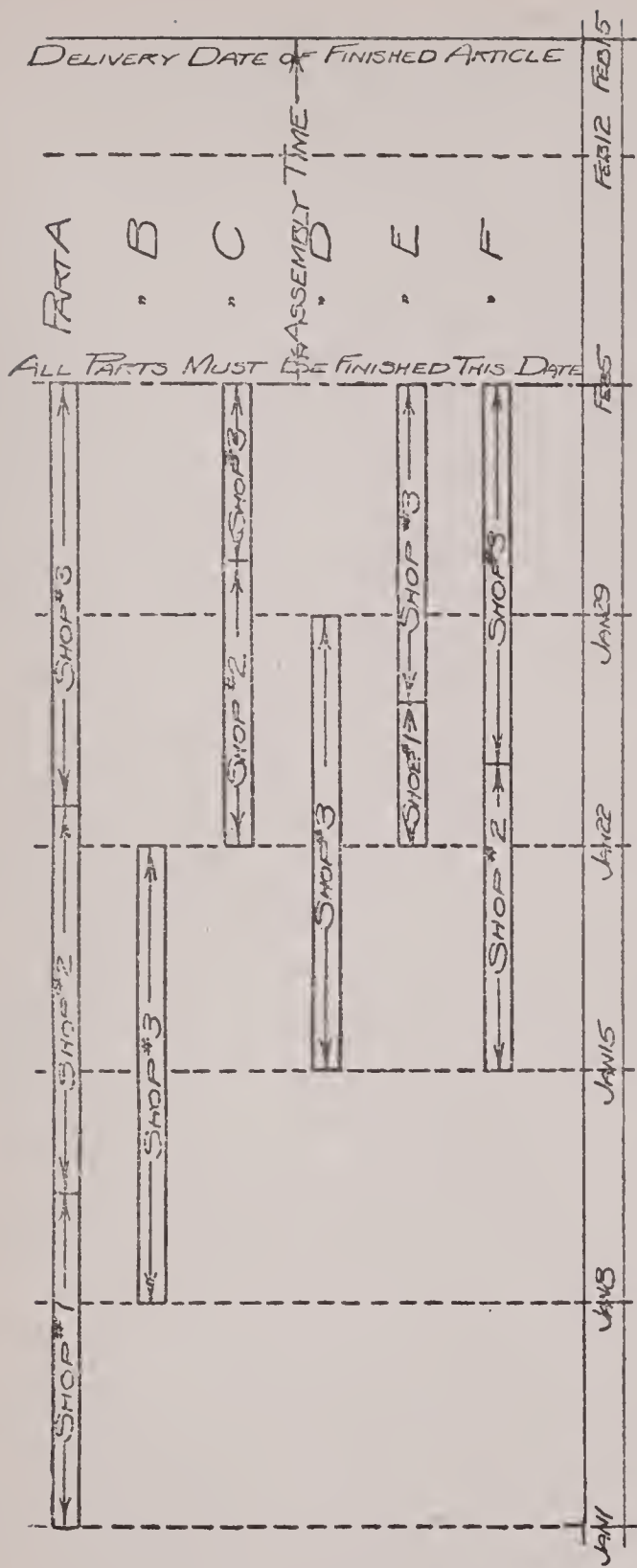
The preceding chart will show briefly how we have taken each step.

Two steps yet remain—starting the job, and doing it.

Starting the Job

Every foreman has had trouble in doing the right jobs at the right time. When this is done, everything usually runs smoothly; but when the jobs get off to a bad start, the whole shop may feel the effect. The shop gets behind on work; the floor is full of work; some men are working overtime, while others are looking for jobs. In the selection of the proper time to do any piece of work is involved much more than the one job. Each job must fit into the manufacturing program of the shop, and must be adapted to conditions peculiar to the shop at that time.

The sixth manual, "The Flow of Work," explains the steps necessary to be taken by the company in order that jobs may start at the right time. Since two steps in the flow of work, namely Scheduling and Dispatching, have much to do with this matter of releasing jobs to workmen at the right time, they will be gone into a little more in detail at this place.



STARTING JOBS AT THE RIGHT TIME

Fig. 10.—The fact that scheduling usually works backwards from the date the finished product is wanted, is well illustrated by this chart showing the scheduling of work to meet the assembly time which is indicated on the extreme right as February 15, six weeks and three days after work starts on the job. The scheduling of the work is usually done by the planning department, but getting the work out to meet the scheduled dates is squarely up to the foreman. A miss in one shop may mean a mile in another.

Scheduling

By scheduling we refer to the setting of delivery dates for the finished job, and for each part that goes to make up the article. A schedule usually works back, in point of time, from the date the finished article is desired. It sets delivery dates for each shop for each part. Scheduling is usually done for the foreman by someone outside of his shop, who sends the foreman the delivery dates as determined from the schedule.

Dispatching

While someone outside the shop, but in close touch with it, usually sets the schedule, the foreman is responsible for the dispatching.

Dispatching is the selection of the best time, man, and machine to perform each operation on each job, in order to meet the delivery dates set by the schedule.

Here are some of the points to be considered by the dispatcher:

1. Consider the shop as a whole.
2. Know the delivery dates for each job.
3. Know which jobs are most needed.

4. Know how long it will take the shop to perform each operation on each job.
5. Know what quantity of work it is best to process as a unit. This governs the size of the lot or batch. A good scheme sometimes is to make a batch equal the output of one man for a day, on the slowest operation.
6. Know the set-up time and cost. Don't spend \$10 to get a machine ready for \$5 worth of production cost.
7. Know the men's abilities and capacities—what each man can and will do.
8. Know the machines—what work can best be done on one, what on another.
9. Keep the floor clean. Know where all work is located.
10. Know just how much of each job has been completed to date,—what operations are yet to be performed on each. Here a route sheet, dispatch boards, control boards, or similar devices are of great service.
11. Lay out a definite program or shop schedule covering the processing of this and every other job in the shop. This is the

main use of control boards (often called by other names).

12. Release jobs to workmen as the shop schedule has outlined.
13. When you can't meet a promised delivery date, at once notify every one interested.

SHOP SYMBOL, EMPLOYEE'S NO. AND NAME <i>DT 87. John Stevens</i>									
USE TIME STAMP RETURNED <i>3:40 PM</i>				SYMBOL AND ORDER NO. <i>H1013KT26</i>			LOT <i>1</i>		
USE TIME STAMP ISSUED <i>9:10 AM</i>									
ORDER NO. <i>8</i>	DESCRIPTION OF PART <i>6" Butcher Knife Blade</i>					MACHINE <i>Grinder 13</i>		FIN NOT FIN <input checked="" type="checkbox"/>	
INSTRUCTIONS <i>Grind both sides as per specifications</i>									
MOVE TO <i>Inspector</i> SIGNED BY <i>H.K.</i>									
QUANTITY TO DO <i>200</i>	QUANTITY <i>195</i>	TO BE REWORKED CREDIT NO CREDIT		SCRAPPED WORK MATERIAL MISC.		PASSED <i>195</i>			
QUANTITY PAID FOR <i>195</i>	OPER HRS. <i>5 1/2</i>	PIECE RATE <i>\$1.10 per 100</i>	HOURLY RATE <i>—</i>	OPER COST <i>\$2.15</i>	BONUS DUTY OVERTIME	TOTAL <i>\$2.15</i>			

Fig. 11.—A time ticket for every man working on a job is another essential to getting the work out. It is made out on a form similar to the one above. This one shows other information than the time, but that is no objection; in fact, it is a distinct advantage.

14. Reschedule the job, if it has been held up, as soon as possible.
15. See that finished work is properly disposed of at once. Don't let it become hidden under benches or otherwise lost, but see that it gets to its proper destination.

This list of the factors governing dispatching is not complete. Some shops may easily have

other problems not mentioned here. A service shop, such as a heat-treating shop, a repair shop, or a buffing shop, may have a very simple schedule—nothing in longer than three days, as is the case in some shops. Others may have very elaborate schedules and dispatching done from control boards.

The scheduling and dispatching system varies with the work of the shop, but the purpose is the same in all, to tell when a job should be started.

So far, only the preliminary work has been discussed. This because it naturally precedes the doing, and because, for example, it is as much a part of the making of a casting as is the actual preparation of the mold or the pouring of the metal. Good planning, preparation, scheduling, and dispatching are essential preliminaries to getting out work.

The dispatcher has actually started the job by releasing it to the worker. Now comes the doing of the work by the workman.

The Actual Doing of the Job

Suppose now that we stop a moment to get just the right point of view here. The preliminary work has been done, the foreman

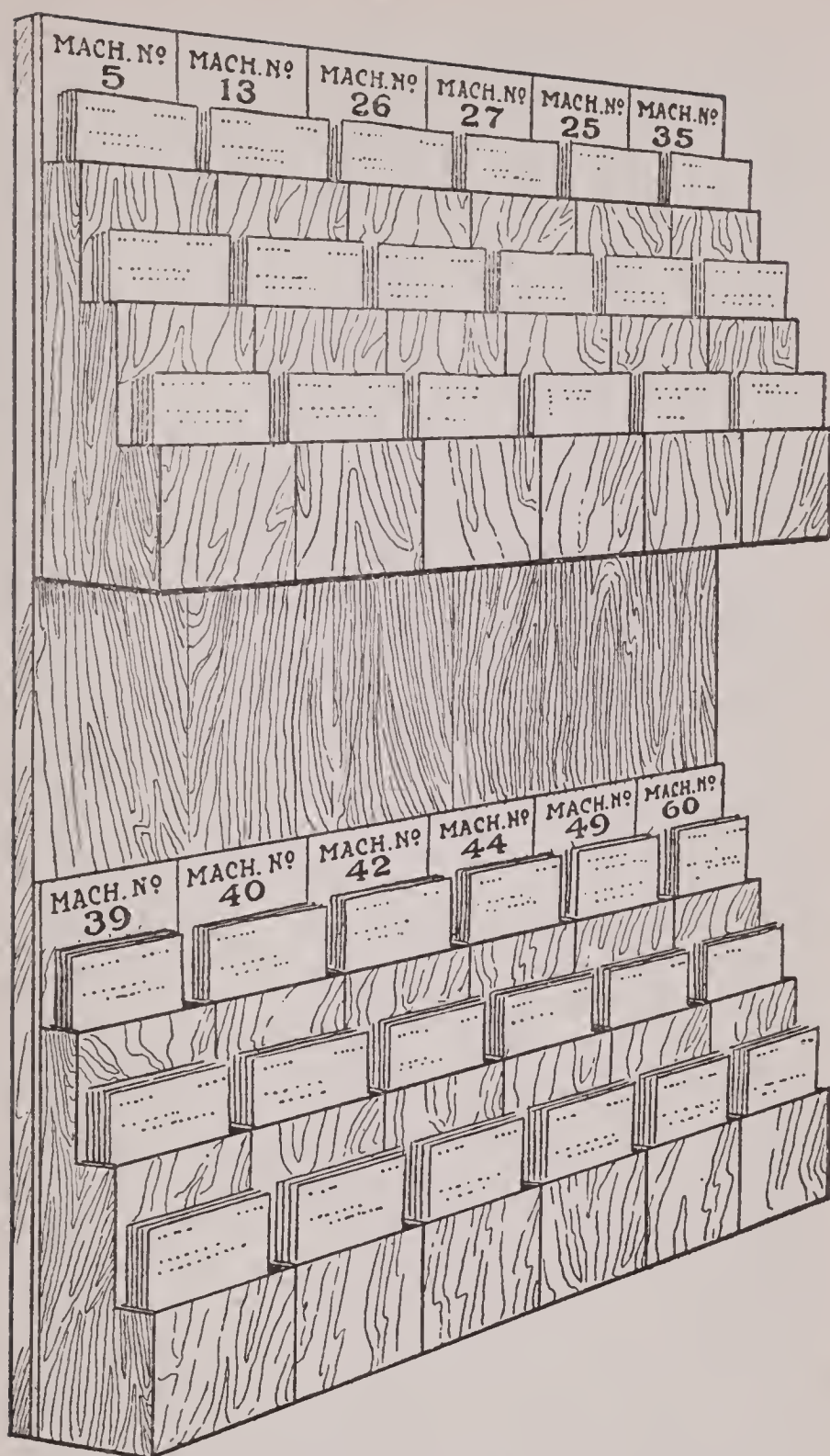


Fig. 13.—A TYPICAL DISPATCH BOARD

has turned the job over to the workman, and the latter has actually begun work on it.

Why doesn't the foreman's duty end here? Why is it necessary for him to be very much on the job even after he has turned the work over to somebody else to do?

It is necessary for him to be on the job because even the best laid plans have a tendency to go wrong. The foreman's "eagle eye" is ever on the watch, and at the first hint that anything is running askew, he locates the trouble and gets the job to running smoothly again.

Any trouble that may arise to stop or slow up production is known as an "interference," and probably the biggest function that the foreman fulfills after the job is started is the removal of these interferences.

Foreman Removes Interferences

Right here the phrase "removing interferences" probably needs a little more explanation. For, in their effect on the outcome of the job, there are two ways to remove interference.

One way is the more leisurely one. When the trouble appears, it is overcome as quickly as

possible, the loss of time entailed is accepted as a matter of course, and the job is finally delivered a few hours or days behind schedule.

But there is another way in which interference may be removed. This way goes on the theory that you have not really removed the interference until you have caught up with the time you lost owing to the trouble. The mail train that has got to get to a certain destination by a certain time, may have trouble that holds it up for a few hours. When the trouble is fixed up, the "interference" is not yet removed. That lost time must be made up.

This is considered efficient practice, namely, to attempt to put each job thru as planned and scheduled.

A great many foremen very rightly go to a little additional expense on a job that is behind time to make sure that their previously set schedule does not fall down at some important machine or on some important piece of work. For example, in a furniture factory, the planer broke down. A large order of desk tops fell behind. Thru overtime the work was gotten out; the assembly took place at the scheduled time; and the delivery date to a big

customer was met. Of course, a decision of this kind is a matter requiring judgment. So after the work has been planned and scheduled, the foreman's job becomes that of removing interferences — of seeing that no interruptions occur in the flow of work.

Steps to Take to Get Out Work

Work once started must be gotten out. The trained production man has a definite scheme to see that it is gotten out. Here are the three steps of this scheme:

Step 1. Know your trouble.

Step 2. Get the job going again.

Step 3. Eliminate causes of trouble.

Each step will now be discussed in turn. Later these steps will be shown in more detail.

Step One—How to Know Your Trouble at Once

It will be worth while to repeat here that "trouble is not so much what happens to a machine or a tool or the power transmission, as it is what happens to the job."

For instance, suppose a certain machine breaks down. Now, if you have another machine all ready to take the place of the injured

one, very little trouble is happening to the job, but if you don't have another machine, then the job you are putting thru is in trouble, and you'll want to know just what kind of trouble it is in.

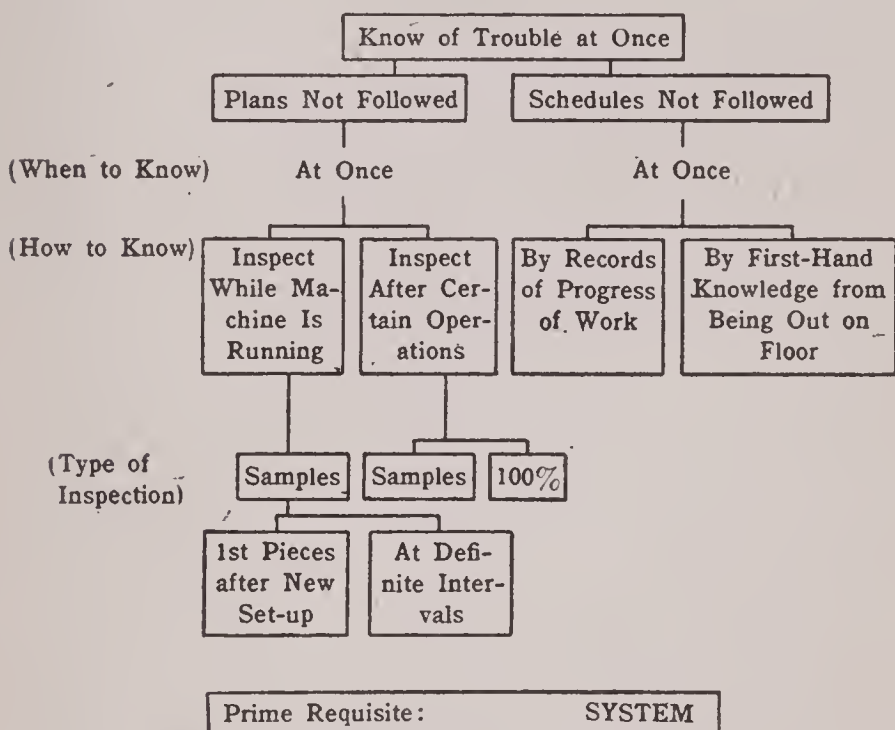


Fig. 14.—Always look trouble squarely in the eye and start fighting it the instant it pops up. Getting the “drop” on it by mapping out your line of attack in advance is one of the surest ways of winning out against it. That is what this chart is meant to do for you.

Figure 14 shows how you go about it to know at once the kind of trouble that is happening to your job. It shows that trouble on a job may be of two kinds:

1. Plans not followed
2. Schedule not followed

How to Know of Troubles with Plans

Trouble comes when plans are not followed. Work is done wrong, for any one of a hundred reasons. Often the damage is done before the foreman learns of it. Only too often work scrapped at the first operation in the shop is not found until the work is about to leave the shop, and frequently not until afterwards. There is seldom a real excuse for this.

How Inspection May Aid the Foreman

The foreman wants to know immediately of any work not being done according to plans. There are two ways to get this information:

1. To inspect the work as it comes off the machines.
2. To inspect after each operation where scrap is likely to occur.

This means that inspection may be a real aid to production, not a mere check on work done some time before.

Inspect Work While the Machine Is Running

It pays to inspect the first few parts coming from any machine after a new set-up or after adjusting. This prevents any appreciable

scrap being made due to any error on the part of the adjuster.

Foremen find that a periodic check of the same kind on the output is also of great assistance in preventing spoiled work. This can be applied to a wide range of processes. It can be done by providing the operator with the necessary gauges or other apparatus, so that he can tell at once when bad work is being done. Another method is to leave this duty to the inspector with the understanding that he will at once notify the foreman of any poor work. This latter method is not so satisfactory if the inspector is not responsible directly to the foreman.

Inspect after Certain Operations

In many shops work is inspected after each operation where scrap is likely to occur. This frequently is done in shops which also inspect work as it is turned out at the machines. Such inspection prevents any further work's being performed on spoiled pieces.

The Two Types of Inspection

There are two types of inspection which can be used:

1. 100 per cent (inspecting every piece).

2. Samples (inspecting a few as representative of the rest).

Which type to use depends entirely on conditions. The general rule is to use the 100 per cent in cases where each part affects an entire assembly and where an operation is subject to serious errors. In cases where these conditions are not met, where one or a few parts are probably representative of all, and where the flow of work requires quick inspection, the sampling method is much the better.

Unnecessary Inspections

Inspection is just like anything else, it is a fine thing if not carried to extremes. Unnecessary inspections should be eliminated. Many operations require no inspection whatever. The inspection of work after a given operation may cover also the work of several preceding operations. The general rule is to inspect as long as such inspection more than pays for itself. When the cost of inspection approaches too near to the saving effected, viewed in the broad sense, it is time to call a halt on the inspection.

Good Inspection Standards

It also pays to watch your inspection standards. Inspection that is too lax allows defec-

tive work to pass that causes trouble later. But too rigid inspection is equally bad, because it requires too high a grade of workmanship, slows up production, and scraps perfectly good work. Don't machine down to .001 if .005 is just as good. Don't attempt a high finish on work that doesn't require it. To be too fussy is just as inefficient as to be too easy.

We have seen that inspection is perhaps the foreman's best method of knowing whether the plans are being followed, so that trouble may be prevented along that line. The next question is: Is the schedule being followed?

How to Know of Trouble with Schedules

The experienced foreman knows that there is no use in trying to get a job thru on time if he does not learn of the delay until too late, perhaps not until the job, delayed as it was, is out of his shop. So the foreman makes sure that he knows what is being worked on by his men.

This he can do either thru records of the progress of the work or by being out in the shop. Which is the better way depends on the foreman, his system of records, and the nature and size of the job.

Where short rush jobs are common, the foreman must be out on the floor most of the time. In any type of work a successful foreman spends a big part of his day out on the job, where he can see what his men and machines are doing and what progress his work is making. Besides the first-hand knowledge of the situation, there is that equally important factor—the stimulus to the men, the knowledge that the boss knows what each man is doing.

Where a shop is working on long jobs, which take months perhaps to complete, office records of the meeting of schedules are important for getting out work. But this is not a part of getting out the work actually on the floor. The shop schedule should be so laid as to take care of this situation. This is merely another illustration of the importance of scheduling to a production man.

The Need of System

Process inspection and the records of the progress of work are invaluable guides to the places where wastes and interferences are occurring. Neither the inspection nor the records of work can be carried along in a haphazard manner. The inspection should be systematic and the records of work full and com-

plete. Both should give hot-off-the-bat information.

Step Two—How to Get the Job Going Again

Once trouble is called to the foreman's attention, he should make every effort to see that the work is delayed as little as possible. His procedure may be shown graphically as in Fig. 15.

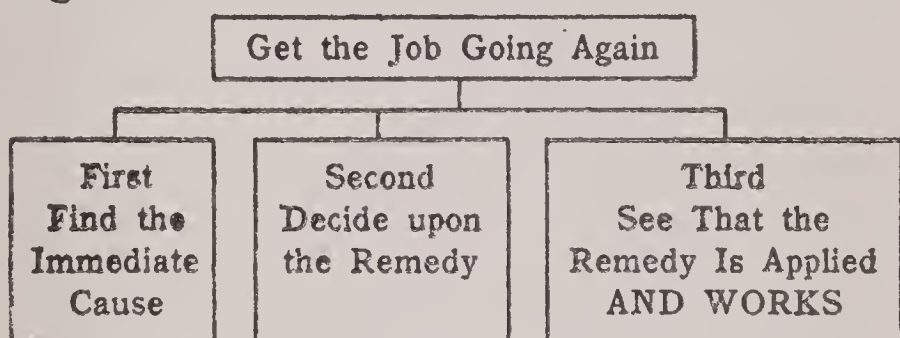


Fig. 15.—After trouble has snarled up the work and it looks as if the schedule is going to pieces, the thing to do is to get the job going again somehow. It's up to you to discover the way. Whatever else you may have to do, the three steps above mentioned are imperative.

Finding the Immediate Cause

The immediate cause is all that concerns the foreman who has work held up. When a hold-up occurs, the question to ask yourself is, "Why did this interference happen at this time?" Never mind classifying the accident as due to any general cause or condition. Don't waste time in argument or useless effort to fix the blame. Find out just enough so that you can go ahead.

Here is the way one old foreman finds out why a machine is stopped. First he tries the power—no trouble there. Then he starts at the tool point, and goes first back thru the work, thru the holder, and thru the mechanism that controls the movements of the work. If the trouble is not here, he goes back to the

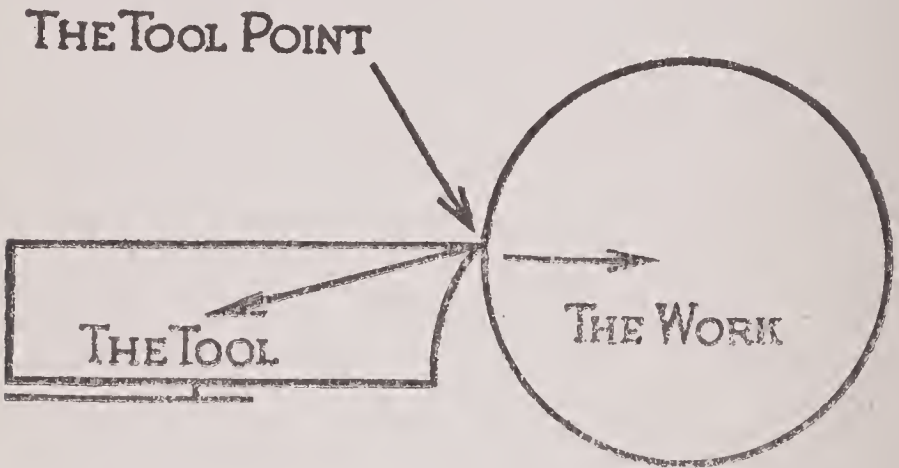


Fig. 16.—Generally the tool point is the index to the speedy location of production troubles. Don't merely look for trouble but start where the trouble shows up, in this case at the tool point, and work along definite lines either back thru the tool or into the work.

place that the trouble shows up, and examines the tool, the tool holder, and the mechanism controlling its action—and finds the trouble.

This method of finding the immediate cause of the trouble by starting at the point of the trouble and working back each way—into the tool and equipment and into the work being processed—until the cause is found, need not

be confined to metal working machines, or in fact, to machines of any kind. It is applicable to almost any kind of work.

Deciding Upon the Remedy

In this second step that we are now studying—getting the job going again—we have made our first move by finding the immediate cause of the hold-up. We have next to decide upon the best thing to do in the emergency. The immediate future should have more weight than a permanent solution of the difficulty. If a gear is broken, put in another one and get the job going. Don't worry if you have to use an old, worn gear provided it does the work for the time being. You can order a new one and put it in later without holding up production. Foremen who are onto the tricks of the trade know any number of expedients that will get the work going. Here is where a foreman's resourcefulness has full play.

Seeing That the Remedy Is Applied

Knowing the trouble and the remedy is not sufficient. The foreman must see that the remedy is applied and works—that the results are obtained. This means that the foreman must follow up on all interferences and see that they are dealt with. He must put his

personal drive and leadership into this. Things get held up when the persistent urge of the production man is missing. All the qualities of leadership are called into play. Experience, resourcefulness, inventiveness, all are essentials in this follow-up. "Get it done" sums up the whole story. It is the "man" in foreman that gets the results.

Step Three—How to Eliminate Causes of Trouble

Elimination of the deeper causes of trouble comes after the interference is disposed of. There is no time for it before. This does not mean that the successful foreman does not later do this. It's a necessary part of his job.

When a milling machine breaks down, the immediate cause may be a broken gear. The foreman finds this and gets it replaced. But the incident is not closed. Next comes the question, "Why did the gear break? Was it the steel, or the heat treatment? Or was it some piece of stock that somehow got into the mechanism? Was the operator a green man on the job? Was it negligence?" A hundred other questions may be asked. Once the real reasons are found, the foreman can plan how to eliminate those causes of trouble as far as possible, perhaps entirely.

CAUSES		RESULTS				
		COMPLETE HOLD-UP	SLOW WORK	REWORKING NECESSARY	SCRAP	OTHER
FLAWS	INCORRECT					
	NOT FOLLOWED					
	INADEQUATE					
PREPARATION	MEN					
	MACHINES					
	EQUIPMENT-TOOLS					
	SUPPLIES					
	WORK ITSELF					
SCHEDULING DISPATCHING	POOR JUDGMENT					
	RECORDS—SLOW					
	" INCOMPLETE					
	" INCORRECT					
	RUSH WORK					
	NOT FOLLOWED					
TRUE INTERFERENCE	POOR STOCK					
	OTHER SHOPS FAULT					
	NO WORK					
	MACHINE TROUBLE					
	TOOL TROUBLE					
	POWER TRANS. TROUBLE					
	NO POWER					
	MEN ABSENT					
	" UNDER STRAIN					
	" OTHER MOTIVES					
INSPECTION	FOREMAN'S ERROR					
	STANDARDS TOO LAX					
	" TOO RIGID					
	METHODS—DELAY WORK					
	" - DON'T AID SHOP					
	MADE TOO FREQUENTLY					
	MADE TOO SELDOM					

TROUBLE ANALYSIS CHART

Fig. 17.—When trouble occurs (and it's bound to, even in the best regulated factories) iron it out and get back on schedule the quickest way you can. Remember, however, that if you want to manage your job instead of having the job manage you, you must run the trouble down and place the responsibility exactly where it belongs, otherwise you lose control. You won't miss fire if you use a chart like this.

Planning, getting ready, scheduling, dispatching, process inspection, and progress records are the outgrowth of this sort of study on the part of thousands of shop men. Each eliminates some interference with the smooth flow of work that would otherwise be in evidence. The justification for their use is that they work. More and better work is done more economically when these broad principles are followed than when they are not practised.

The Use of Routine Methods

It will be well here to discuss the advantage of reducing as much of the shop work as possible to routine. For one thing, there is less chance of error, less confusion, when a certain matter is always handled in the same routine manner. But a greater advantage is that the handling of this work can be turned over in large part to assistants, thus leaving the foreman free to deal with the more important problems of his job and with those interferences that cannot be handled as a matter of routine. When a foreman always is saying, "I never have time to think out how to improve my shop," it is very likely that he is trying to do everything himself and is not relying upon his assistants to take care of the less important work.

The Importance of Records

Another matter of first importance to foremen is the proper use of shop records. There are many kinds of shop records, but here only production records will be discussed. The four main elements of production records are shown in Fig. 18.

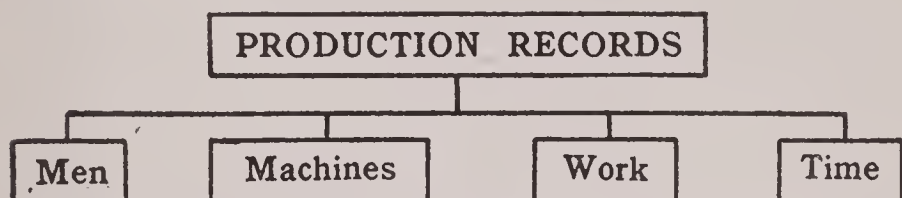


Fig. 18.—The kind of shop records you use to assist you in getting out the work makes little or no difference so long as they include exact information about these four factors.

Any production record can be classed as above. Some records deal with only one element. Many tie all four together. Many foremen have found that it aids them in thinking, to classify the information shown on a record according to these four elements. For instance,

A blue print plan deals only with the work.

A plan of work (as usually used) deals with the work, machines, and equipment.

Material tickets deal as a rule with both work and time (and perhaps machines or the men).

Work tickets deal with all four elements.

Progress Records

When the information of work tickets and material tickets is summarized and kept up-to-date so as to show the present standing of the shop on all jobs, we have what may be termed "progress records."

Some plants use several records, while others put all the information on one summary. These progress records are referred to by different names in different factories and industries. They may be termed control boards, dispatch boards, planning boards, route sheets—any variety of names. Always their purpose is to picture all four elements of the work in as concise and practical a method as possible.

A second purpose of these boards, etc., more important even than the record of the past and present study of the shop, is to serve as a convenient basis for laying out future schedules of work. The past cannot be helped, except in so far as the future will permit.

Very often control boards as such are not the best means of showing the situation. But some summarized record of work, men, machines, and time, is kept by every experienced foreman.

On page 54 are shown three outlines giving the fundamentals on which all progress records are built, that may be of assistance in fixing in your mind the general nature of this type of record. Note that in each of these charts men, machines, and work are matched against the element of time.

The value of any shop record is entirely up to the foreman. He has it in his power to make useful, dependable records, or to permit the making of slipshod, misleading papers. The use of any except reliable records recalls the following incident:

The general foreman of a big machine shop manufacturing industrial trucks had a rush order of 100 of a certain model. By his records he had 147 of a certain small part necessary for assembly. Actually he had but 47. Results: held-up work and an angry customer.

The foreman who really uses records as an aid in his work is the man who sees to it that only carefully chosen and equally carefully kept records are made.

Why Does Every Shop Have a Foreman?

Years ago, an Arizona Indian was having a wonderful time examining the first automobile he had ever seen. The owner, noting his curi-

WORK	TIME					
	MON	TUES	WED	THURS	FRI	SAT
#138 20 MILL. MACH. CUTTERS STYLE #14	LATHE #14	MILLER #6	MILLER #6	HEAT TREAT -	GRINDER #3	

#1

MACHINES	TIME					
	MON	TUES	WED	THURS	FRI	SAT
GRINDER #3	#133	#135	#139	#139	#138 MILLER CUTTERS	

#2

MEN	TIME					
	MON	TUES	WED	THURS	FRI	SAT
THOMPSON	#60	#60	#61	#61	#138 MILLER CUTTERS	
NEIHARDT						
TONELLI						
O'BRIEN						
JANSKY						

#3

THREE WAYS OF FIGURING THE PROGRESS OF WORK

There are three possible ways of figuring progress—the progress of the work, the progress of the machines, and the progress of the men. Usually a progress record shows only the one factor which is the most important for a shop to keep track of.

The charts here shown illustrate how the progress of each of these factors (work, machines, and men) can be shown on one chart.

Chart No. 1 is the type of progress record to be used where it is necessary to show how the work is progressing. For example, suppose you are on job No. 138, making 20 milling machine cutters, style "A." Your progress record shows that on Monday it was turned down in the lathe section, on Tuesday and Wednesday the teeth were being milled in the milling section and so on.

Chart No. 2 is used in a shop where the machines are at a premium. For example, suppose that in this progress record Grinder No. 3 is listed. The record shows that on Monday this machine worked on job No. 133; on Tuesday, on job No. 135; on Wednesday on job No. 139, and so on.

Chart No. 3 is used where it is most important to keep track of the progress of the men. Their progress is listed by the jobs handled, as in the case of the machine record. Any control board or other progress record you use will be found to be based on one or more of these charts.

osity, explained the mechanism to him at great length. The man was very much interested and seemed to understand everything thoroly as it was being explained to him. But as he was leaving, he said, "There's only one thing I don't see. What makes it go?"

And the same question may be asked of the shop and of the getting out of work.

You can't get away from the personal factor in any line of industry. The production qualities of the foreman himself are the forces that are behind getting the work out. They are efficient only when they work in harmony with the principles shown in the manual, just as the electric spark and the gasoline are most efficient when combined in the right manner, at the right time, in the right place. The FOREMAN puts the spark of life into his industrial machine—his shop.

Qualities of a Good Production Man

It will be well worth while to note the marked characteristic that stands out in a good production man. It is discussed in the first manual, but is here repeated in a slightly changed form, to emphasize its importance and for the sake of rendering this manual complete in itself. This characteristic of the successful foreman is typical of every leader of men.

Inward Drive

Inward drive and force is the foremost requisite. One man gives an order, and it fails to go across; while another man gives the same directions, and the work is as good as done before it is started. It's the man with the punch who gets the results. This inner force is based on courage, determination, energy, self-confidence, purpose, a desire for tangible results, and the ability to inspire others. When such a man comes into any shop—into any organization—his presence is felt in some indefinable way. He usually does not do a great deal of loud talking, but he always must be reckoned with. He is always getting something done, never merely talking about doing it.

All production men have this quality to a high degree. If space permitted, the other qualities of the leader and executive would be discussed in detail. It will be well to review the first manual, "The Foreman and His Job," and the third manual, "Leadership," in this connection. The qualities there discussed are essential to the foreman in getting the work out.

A Word in Conclusion

This entire series of foremanship manuals may be likened to a tool—designed not to be looked at and enjoyed, but to be used.

But in a tool, different parts have different functions. A portable power tool, for instance, may be composed of motor, housing, transmission, and cutting tools. In this series the present manual is the cutting tool. It has been prepared entirely with the idea that you are to find real use for it in your regular day's work.

To make this use all the handier to you, we have prepared a chart covering the whole manual and enabling you at a glance to look over the entire field of "getting the work out," and so to check up on your own work. The chart appears directly opposite. Analyze it closely, because it summarizes all the important steps outlined in this manual.

Refer to it frequently, not only as a guide to retrace these steps and to fix them firmly in your mind, but also to get a bird's-eye view of all the problems which you must face every time you put an important job into work. Nothing you do means more in your favor if

THE WAY TO GET WORK OUT

BEFORE THE WORKMAN GETS THE JOB

WHILE HE IS WORKING ON THE JOB



SYSTEM AND RECORDS

THE PRODUCTION QUALITIES OF THE FOREMAN

you succeed, nor will anything stand against you as a blacker mark if you fail, than the way you get out the work. This chart is a direct approach to a successful way to meet this big problem.

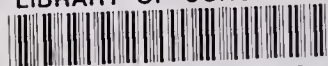
In summing up the contents of this manual, we find that three facts stand out as of prime importance in getting out work.

1. A definite program must be mapped out and prepared for.
2. That program must be followed in spite of any obstacles.
3. In putting that program thru, the whole responsibility is placed on you, the foreman. It is you that put the spark of life into your shop.

This is the way to get out work.

The next manual — the ninth — deals with stockkeeping, the care of materials of all kinds, raw materials, work on the floor, partly finished stores, and finished stores. It treats also of the care and maintenance of tools, equipment, and supplies. It gives only the best modern practice and is well worth the close and careful attention of every foreman.

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